

the inner surface of the hollow portion surrounded by the outer shell member of the golf club head as claimed is separate from the inner surface of the hollow portion. This is shown in Fig. 5 of the application.

As pointed out previously, in Okada the hosel for joining a shaft to the golf club head is integral with the head body. However, because Nishio discloses "a club head having a hosel member separately attached to the outer shell," the Examiner believes it would have been obvious in view of Nishio to have the hosel of Okada "attached separately."

In making this rejection, the Examiner has only considered the English abstract of Nishio. So that the Examiner can better understand the teachings of this reference, attached is a complete English translation of the reference.

First of all, it is apparent that Nishio does not disclose the claimed features of the present invention that (i) the inner surface of the hollow portion including the inner surface of the closed shaft insertion hole has no projecting portions thereon, and (ii) the separate inner surface of the closed shaft insertion hole forms a continuous surface with either or both of a concave and flat surface of the inner surface of the hollow portion. This is apparent from Figs. 3A and B as well as the description in paragraph [0016] of the English translation of Nishio. The club shaft insertion hole may be closed, but the inner surface of the hollow portion of the golf club head has projections, and the inner surface 4a of the closed shaft insertion hole of the hosel member 3 is not continuous with the inner surface of the hollow portion.

Nevertheless, without explaining how, the Examiner believes that because of Nishio it would be obvious to "separately attach" the hosel of Okada to the club body. In making this rejection, the teachings to support the prima facie case of obviousness must

come from the cited references and not from any teachings in Applicants' application. As noted in M.P.E.P. § 2142, "hindsight must be avoided and the legal conclusion [of obviousness] must be reached on the basis of facts gleaned from the [cited] prior art."

In this regard, Nishio describes in paragraphs [0021] and [0022] of the English translation that the engagement part 10 between the hosel receiving part 4 of the club head and the hosel member 3 is necessary to obtain the required strength between these parts. Preferably the engagement part 10 includes two or more projecting parts 7 and concave parts 9 so that the bonding strength between the hosel receiving part 4 of the club head and the hosel member 3 can be even better. Moreover, Nishio does not disclose any alternative configuration for attaching such parts together having no engagement parts 10.

Thus if Nishio is to be combined with Okada, the structure of Nishio for joining the hosel to the head body must also be considered. The particular joining structure of Nishio is the only teaching put forth about how such parts could be joined.

Consequently, if the joining structure of Nishio is used to join the hosel to the head body of Okada, the resulting golf club head would suffer from the same deficiencies as Nishio. Nishio does not form a part of the inner surface of hollow portion M of the club head with the bottom of closed shaft insertion hole 6 of hosel member 3 without engagement parts 10, so it would not be possible to provide the claimed "continuous surface."

Nor can the particular joining structure of Nishio be ignored, because the claims specifically recite how the members are to be joined, as set forth in the second paragraph of claim 7 and the third paragraph of claim 9. Consequently, the Examiner

must show how the separate members of Okada would be joined in this manner without relying on the teachings of Applicants' specification.

As noted in M.P.E.P. §§ 2142 and 2143, the key to supporting an obvious rejection "is the clear articulation of the reason why the claimed invention would have been obvious." One of the ways to show this as set forth in §2143(G), is to point to a teaching, suggestion or motivation in the prior art that would have led one of ordinary skill "to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention." The Examiner has not done this in combining Okada and Nishio as proposed because he has failed to show how Okada could be modified to make them separate members and still be joined together in the manner claimed. Thus it is submitted that the Examiner has not sufficiently articulated the reasons to support a conclusion of obviousness as required by the M.P.E.P. and the Supreme Court in *KSR International Co. v. Teleflex, Inc.* 127 S. Ct. 1727 (2007).

Regarding Mackay and dependent claims 10 and 11, it may disclose applying pressure to the inside of the hollow portion, but it does not disclose what is missing in the combination of Okada and Nishio.

Thus, it is submitted that the combination of references relied on by the Examiner in the Office Action do not support a conclusion of obviousness. Their withdrawal as a ground of rejection of claims 7 and 9, as well as claims 10 and 11 dependent therefrom, under §103(a) and allowance of the claims is requested.

In view of the foregoing remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

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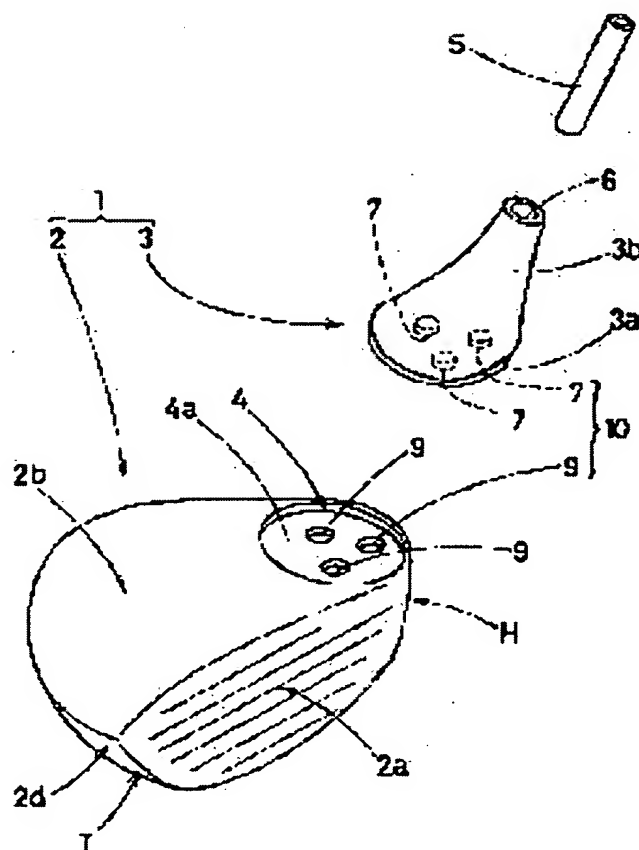
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(54) GOLF CLUB HEAD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a golf club head having a high degree of freedom in centroid design.

SOLUTION: This golf club head consists of a metallic head body 2 having a hollow part and a hosel member 3 mounted at a hosel rest part 4 disposed in this head body 2. The hosel rest part 4 is formed a small depth existing near the heel of a crown part 2b and a recess having a bottom 5. The hosel member 3 is composed by using a low-specific gravity material having the specific gravity smaller than the specific gravity of the head body 2 and has a fitting part 3a having the bottom plate 5 disposed in the hosel rest part 4. Either of the bottom 4a of the hosel rest part 4 or the bottom plate 5 of the hosel member 3 is provided with an engaging part 10 consisting of a projecting part 7 which projects toward the other and a recessed part 9 which is disposed at the other and fits the projecting part 7.



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CLAIMS

[Claim(s)]

[Claim 1]A golf club head provided with an engagement part characterized by comprising the following.

A head body which provided metal and a hosel receiving part which have a centrum. Consist of a hosel member which rose from a head body and was provided with a shaft insertion hole by being attached to said hosel receiving part, and said head body, A small depth dent located in heel slippage of a crown part in said hosel receiving part also forms it as a dent part provided with a pars basilaris ossis occipitalis, and said hosel member, Heights which have a ** part which has a bottom plate arranged on said hosel receiving part using low-specific-gravity material whose specific gravity is smaller than said head body, and project towards another side in either a pars basilaris ossis occipitalis of said hosel receiving part, or a bottom plate of said hosel member.
A crevice which is established in said another side and attaches said heights.

[Claim 2]The golf club head according to claim 1, wherein said head body is formed without projecting from a hosel sequence side which turned an outside surface of said crown part to said hosel receiving part, and made it extend smoothly.

[Claim 3]The golf club head according to claim 1 or 2 said hosel receiving part's breaking off and carrying out a termination within said centrum by the depth of said pars basilaris ossis occipitalis from a hosel sequence side which turned an outside surface of said crown part to said hosel receiving part, and made it extend smoothly being 15 mm or less.

[Claim 4]A golf club head of any 1 statement of claims 1 thru/or 3, wherein said engagement part sets the amount of dents of said crevice to 1.5-10 mm while including two or more said heights and said crevices, respectively.

[Claim 5]Said engagement part is a golf club head of any 1 statement of cylindrical shape, a prismatic form, and claims 1 thru/or 4 that form said heights and a crevice cross shape or annularly.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]The weight saving of the hosel part is carried out in this invention. Therefore, it is related with the golf club head which can raise the flexibility of a center-of-gravity design of a head.

[0002]

[Description of the Prior Art]Generally, in the design of a golf club head, it is a very important problem how a centroid position is set up. Especially the centroid position of a head is closely connected with the performances of a head, such as "return" of the amount of backspins of a hit ball and the head at the time of impact, and demarcating sweet spot area further. For this reason, as for the design flexibility of the centroid position of a head being high, it is desirable to carry out that it is easy to raise a ball by making low the height of center of gravity of a head, for example, and to make centroid distance of a head small and to raise return of a head etc., in order to improve various the ease of striking.

[0003]What equipped one with hosel part c provided with shaft insertion hole e which rises from the heel side of head body b and this head body b, and equips with the shaft d as the metal golf club head a1 which has the centrum M is common so that it may be shown in the former, for example, drawing 7. Although said shaft d usually adheres to shaft insertion hole e using adhesives, since there is a possibility of dissociating in the time of swing, etc. when there is little of both adhesion area, adhesion length is needed about 40 mm in shaft orientations.

[0004]The general weight of hosel part c is about 12g, and if standard head gross weight shall be 180 g, it will occupy about 6.5% of head gross weight. Therefore, a head body product must be made small, so that the weight of hosel part c is large, since there are problems, such as becoming higher than the position which the centroid position of the head meant by the weight of this hosel part c, and approaching the heel side, and head gross weight is usually determined beforehand.

[0005]As shown in drawing 8, the head a2 which lost the hosel member which projects in a way outside head body b is proposed. This thing forms the cylinder part f for shaft plugs which penetrates the inside of head body b up and down.

The shaft d is adhered there.

In this head a2, although ShinTakashige-ization can be controlled, it becomes easier to

approach the heel side by reduction of hosel members than the position which the centroid position meant too by the weight of said cylinder part f.

[0006]The head a3 shown in drawing 9 contains the hosel member g which is inserted in head body b which formed the cylinder part f which has the breakthrough h inside, and said cylinder part f from the bottom, and holds the shaft d (for example, JP,5-96031,A). The hosel member g inserted in the breakthrough h of said cylinder part f comprises fiber reinforced plastics (FRP) thru/or a woody material. In this head a3, although the hosel member g is constituted from lighter weight materials, since it is necessary to form said cylinder part f in the inside b of a head, the centroid position of a head tends to serve as heel slippage too.

[0007]The head a4 shown in drawing 10 consists of head body b and hosel part c, and said hosel part c, It comprised the outer tube section c1 which makes head body b and one and comprises same metallic material, and the internal cylinder part c2 which consists of fiber reinforced plastics, and the shaft d is adhered to this internal cylinder part c2. Since formed protruding of the outer tube section c1 which comprised a metallic material as head body b with this same head a4 is carried out, a centroid position tends to become high too.

[0008]Thus, since the centroid position of a head all tends to have become high or the conventional heads a1 thru/or a4 tend to have served as heel slippage, in order to have raised the design flexibility of the centroid position of a head, there was room for an improvement further. think out in view of the above problems in this invention -- **. Therefore, it aims at providing the golf club head which can raise the flexibility of a center-of-gravity design of a head further on the basis of carrying out the weight saving of the hosel member, and improving the mounting shape to a head body, etc.

[0009]

[Means for Solving the Problem]A head body in which the invention according to claim 1 provided metal and a hosel receiving part which have a centrum among this inventions, Consist of a hosel member which rose from a head body and was provided with a shaft insertion hole by being attached to said hosel receiving part, and said head body, A small depth deer located in heel slippage of a crown part in said hosel receiving part also forms it as a dent part provided with a pars basilaris ossis occipitalis, and and said hosel member, Heights which have a ** part which has a bottom plate arranged on said hosel receiving part using low-specific-gravity material whose specific gravity is smaller than said head body, and project towards another side in either a pars basilaris ossis occipitalis of said hosel receiving part, or a bottom plate of said hosel member, It is characterized by having an engagement part which consists of a crevice which is established in said another side and attaches said heights.

[0010]The invention according to claim 2 is the golf club head according to claim 1, wherein said head body is formed without projecting from a hosel sequence side which turned an outside surface of said crown part to said hosel receiving part, and made it extend smoothly.

[0011]The invention according to claim 3 said hosel receiving part, It is the golf club head according to claim 1 or 2 breaking off and carrying out a termination within said centrum by the depth of said pars basilaris ossis occipitalis from a hosel sequence side which turned an outside surface of said crown part to said hosel receiving part, and made it extend smoothly being 15 mm or less.

[0012]It is a golf club head of any 1 statement of claims 1 thru/or 3, wherein the invention according to claim 4 sets the amount of dents of said crevice to 1.5-10 mm while said engagement part included two or more said heights and said crevices, respectively.

[0013]Said engagement part of the invention according to claim 5 is a golf club head of any 1 statement of cylindrical shape, a prismatic form, and claims 1 thru/or 4 that form said heights and a crevice cross shape or annularly.

[0014]

[Embodiment of the Invention]Hereafter, one gestalt of operation of this invention is explained based on a drawing. As for drawing 1, the exploded perspective view of the golf club head (it may only be hereafter called a "head".) 1 of this embodiment and drawing 2 illustrate the top view, drawing 3 (A) illustrates the A-A line sectional view of drawing 2, and drawing 3 (B) has illustrated the elements on larger scale, respectively. In the figure, the head 1 comprises the head body 2 which provided the metal and the hosel receiving part 4 which have the centrum M, and the hosel member 3 which rises from said head body 2 by being attached to said hosel receiving part 4.

[0015]Crown part 2b which said head body 2 stands in a row in the upper limb of the face part 2a which hits a ball, and this face part 2a, and makes the upper surface of a head, The sole part 2c which stands in a row in the margo inferior of said face part 2a, and makes the head bottom, By this example, the wood type thing is illustrated including the side part 2d which inherits between said crown part 2b and the sole parts 2c, and is extended from the tow T of said face part 2 to the heel H of said face part 2a through a back face. Metallic materials, such as titanium, a titanium alloy, stainless steel, and an aluminum containing alloy, can use such a head body 2 conveniently, for example, and it can be constituted by welding two or more parts produced by casting, a forge, or a press carrying out such materials. Although not illustrated, a balance adjustment member, foamed resin, etc. can be arranged on said centrum M if needed.

[0016]While being located in heel H slippage of said crown part 2b, by this example moreover provided with the pars basilaris ossis occipitalis 4a in the small depth, said hosel receiving part 4 formed as a dent part which makes approximate circle shape is formed in said head body 2. The hosel receiving part 4 is the small depth, and is formed as the depth which does not reach said sole part 2c. As shown, for example in drawing 3, more specifically, it is desirable for the depth D1 of said pars basilaris ossis occipitalis 4a from the hosel sequence side P which turned the outside surface of said crown part 2b to this hosel receiving part 4, and made it extend smoothly to be 5-10 mm still more preferably 10 mm or less more preferably 15 mm or less. Thereby, what breaks off and carries out a termination within this centrum M is illustrated, without the hosel receiving part 4 of this example reaching the sole part 2d in the centrum M. For this reason, the extreme weight distribution by the side of a heel can be controlled.

[0017]What was formed without the head body 2 projecting in the method of outside from said hosel sequence side P is illustrated. In this case, since the metallic material portion which forms the head body 2 can be prevented from being located in the height of the head 1, it is useful especially to prevent the centroid position of the head 1 from shifting to the height side.

[0018]Next, said hosel member 3 comprises low-specific-gravity material whose specific gravity is smaller than said head body 2. As a low-specific-gravity material, it is a nonmetal material preferably, for example, a plastic, fiber reinforced plastics (FRP), or a woody

material is desirable. As fiber reinforced plastics, one sort, such as carbon fiber, a boron fiber, and glass fiber, or two sorts or more can be blended and combined, for example, and reinforced plastic can be constituted. Such fiber reinforced plastics are preferred at especially the point that also has the intensity required of a hosel part while being made to low specific gravity (about [for example,] about 1.5) rather than a metallic material.

[0019]The hosel member 3 contains the ** part 3a which has the bottom plate 5 arranged on the hosel receiving part 4 provided in said head body 2, and the rising portion 3b which rises from this head body 2 and is extended when attached to the head body 2, as shown in drawing 4. The shape of the skirt portion, etc. are finished so that it may be smoothly connected with crown part 2b, when said rising portion 3b is attached with the hosel receiving part 4. The shaft insertion hole 6 where it is equipped with the shaft S is formed, and the tip part of the shaft S is inserted in this shaft insertion hole 6, for example, the rising portion 3b adheres with adhesives etc. Said ** part is projected from said rising portion 3b, and what was formed by the slightly elevated approximately cylindrical shape which fits each other into said hosel receiving part is illustrated.

[0020]The head 1 of this embodiment inserts the ** part 3a of said hosel member 3 in the hosel receiving part 4 of said head body 2, attaches it with doubling adhesives etc., and is constituted by one. While the hosel member 3 consists of low-specific-gravity material, such a head 1, Since the hosel receiving part 4 is formed as a dent part of the small depth, the weight saving of the weight of a hosel part can be carried out substantially, and it can prevent effectively a centroid position being highly set up like the conventional head, and becoming heel H slippage. Therefore, by distributing the weight of the head 1 suitably, a centroid position can be set up arbitrarily and design flexibility can be improved further. By the ability to have attained the weight saving of the hosel member 3, the weight of the part is moved to the head body 2, and it also becomes possible to attain free center-of-gravity design and enlargement of a head body product.

[0021]The head 1 of this embodiment is provided with the engagement part 10 which consists of the heights 7 which project towards another side established in either the pars basilaris ossis occipitalis 4a of said hosel receiving part 4, or the bottom plate 5 of said hosel member 3, and the crevice 9 which is established in said another side and attaches said heights 7. In this example, while forming said crevice 9 in the pars basilaris ossis occipitalis 4a of said hosel receiving part 4, what formed said heights 7 in the bottom plate 5 of said ** part 3a of the hosel member 3 is illustrated. For this reason, the head body 2 and the hosel member 3 can join certainly, and the head 1 provided with sufficient bonding strength is provided, and also suppose that the alignment at the time of attachment is also easy.

[0022]As for said engagement part 10, what includes two or more said heights 7 and said crevices 9, respectively is preferred. This can raise further the bonding strength of the hosel receiving part 4 and the hosel member 3. As shown in drawing 3, it is more preferably desirable [the amount D2 of dents from said pars basilaris ossis occipitalis 4a of said crevice 9] still more preferably to be referred to as 2.0-5.0 mm 1.5-5.0 mm 1.5-10.0 mm, for example. When there is a tendency for bonding strength to fall [said amount D2 of dents] relatively at less than 1.5 mm and it exceeds 10.0 mm conversely, there is a tendency which the centroid position of the head 1 becomes high, or becomes heel slippage.

[0023]Although what was formed each by three cylindrical shape is shown by this example,

the heights 7 and the crevice 9 which make such an engagement part 10, Proper shape -- as a prismatic form may be adopted besides this and it is shown in drawing 5 (A), suppose that it is annular, or as further shown in drawing 5 (B), considering it as cross shape etc. combines these further -- is employable. Said heights 7 and the crevice 9 are formed in a member respectively contrary to illustration, and also it can also provide in both the pars basilaris ossis occipitalis 4a of the hosel receiving part 4, and the bottom plate 5 of said hosel member 3.

[0024]

[Example]The wood type golf club head (EXAMPLE) shown in drawing 1 - 3 was made as an experiment, and a height of center of gravity and centroid distance were measured. the structure shown in drawing 7 for comparison -- abbreviated -- a prototype was collectively built also about the wood type golf club head (conventional example) of the same head body product, and a height of center of gravity and centroid distance were measured similarly. The example and the conventional example unified the volume of 182 g and a head into 340 cc for the gross weight of the head. The head of the example adopted the titanium alloy as the head body, and adopted carbon fiber reinforced plastics as the hosel member. In the conventional example, the whole head is formed from said titanium alloy.

[0025]As shown in drawing 6 (A), measure the height of center of gravity of a head as the vertical distance A from the level surface to the center of gravity G, and centroid distance, As shown in drawing 6 (A) and (B), the normal taken down from the center of gravity G at right angles to a face made G' the intersection at which this face is crossed, and measured as the shortest distance B of this intersection G' and the center line of a shaft. The result of a test is shown in Table 1.

[0026]

[Table 1]

	従来例	実施例
ヘッド総重量 (g)	182	182
ヘッド体積 (cc)	340	340
重心高さ (mm)	27.5	26.4
重心距離 (mm)	33.2	31.5

[0027]Compared with the conventional example, the height of center of gravity of a head is low (reduction in the center of gravity), and the thing of the example has checked that centroid distance was also small so that clearly from the result of a test. By the ability to have attained the weight saving of the hosel part, to the ability to have distributed the weight which became light to the sole part (it is 3 mm about thickness), such a weight distribution cannot be performed but the thickness of a sole part is considered in the example because 2 mm was a limit by a conventional example about such a difference.

[0028]

[Effect of the Invention]As mentioned above, while a hosel member consists of low-specific-

gravity material in the invention according to claim 1, Since the hosel receiving part is formed as a dent part of the small depth, the weight saving of the weight of a hosel can be carried out substantially, and it can prevent effectively a centroid position being highly set up like the conventional head, and becoming heel slippage. Therefore, by allotting the weight which could carry out the weight saving, for example by the hosel member to the sole part of a head, etc., low center-of-gravity-ization can be performed easily and the flexibility of a center-of-gravity design of a head can be improved further. By the ability to have attained the weight saving of the hosel member, it also becomes possible to move the weight of the part to a head body, and to attain enlargement of a head body product by extension.

[0029]Since the head is provided with the engagement part which consists of heights which project towards another side established in either the pars basilaris ossis occipitalis of a hosel receiving part, or the bottom plate of said hosel member, and a crevice which is established in said another side and attaches said heights, Even if it is a hosel receiving part of the small depth, a head body and a hosel member can join certainly, and the head provided with sufficient bonding strength is provided, and also suppose that the alignment at the time of attachment is also easy.

[0030]In the invention according to claim 2, the head body can prevent the metallic material portion which forms a head body from being located in the height of a head by being formed without projecting in the method of outside from the hosel sequence side which turned the outside surface of the crown part to said hosel receiving part, and made it extend smoothly. Therefore, it is useful especially to prevent the centroid position of a head from becoming high.

[0031]In the invention according to claim 3, since a hosel receiving part breaks off and a termination is carried out within said centrum by the depth of said pars basilaris ossis occipitalis from said hosel sequence side being 15 mm or less, for this reason, it can control shift of the extreme centroid position by the side of a heel.

[0032]In an invention given in claims 4 thru/or 5, junction to a head body and a hosel member is made firmer, and endurance etc. can be improved further.

[Translation done.]

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]It is an exploded perspective view showing an example of the golf club head of this embodiment.

[Drawing 2]It is the top view.

[Drawing 3](A) is an A-A line sectional view of drawing 2, and (B) is the elements on larger scale.

[Drawing 4]It is a perspective view which illustrates the embodiment of a hosel member.

[Drawing 5](a) - (b) is a perspective view showing other embodiments of a hosel member.

[Drawing 6]The side view of a head in which (A) explains the height of center of gravity of a head, and (B) are the front views explaining the centroid distance of a head.

[Drawing 7]It is a sectional view explaining the conventional head.

[Drawing 8]It is a sectional view explaining the conventional head.

[Drawing 9]It is a sectional view explaining the conventional head.

[Drawing 10]It is a sectional view explaining the conventional head.

[Description of Notations]

1 Head

2 Head body

3 Hosel member

3a ** part

3b Rising portion

4 Hosel receiving part

4a The pars basilaris ossis occipitalis of a hosel receiving part

5 Bottom plate

6 Shaft insertion hole

7 Heights

9 Crevice

10 Engagement part

[Translation done.]